Journal of research in health science
Volume 7-8 issue. 4 2020, pp. 61-71
ISSN 2523-1251 (Online) ISSN 2523-1243 (Print)
JOURNAL DOI 10.37057/2523-1251
www.journalofresearch.org
info@journalofresearch.org

SJIF 2020: 6.224
IFS 2020 4.085

Comparative indicators of the use of local hemostatic agents in surgical interventions in the nasal cavity.

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Abstract.

In the groups of patients with the use of local hemostatic agents, in comparison with the control group, an earlier onset of complete hemostasis was noted, as well as the absence of recurrent bleeding after manipulation. In the group of patients using a gauze tampon, a greater number of undesirable side effects of tamponade in the form of edema and trauma to the nasal mucosa were noted, and these patients also had more pronounced pain syndrome. There were no complications associated with the application of hemostatic agents into the nasal cavity in the studied groups of patients.

Comparative hemostatic assessment of gauze tamponade and hemostatic sponges when used in patients with nosebleeds showed that the time to stop bleeding when using Geotex 4.4 ± 0.6 minutes, with gauze tamponade 9.3 ± 0.5 minutes. In a group patients with the use of patients with the use of hemostatic sponges relapses bleeding was not observed. The average duration of treatment in the group with hemostatic sponges was 6.1 ± 0.9 bed-days. The average duration of manipulation in the Hemotex group was 7.1 ± 0.9 minutes. When using the hemoguba, already on the 7th day, there was no edema of the mucous membrane, a decrease in smell and changes in taste were present only in 22.7% of patients. Analysis of comparative data shows a slight advantage of using hemostatic sponges over anterior tamponade in patients with nosebleeds.

Keywords: hemostatic sponge, bleeding, fibrinogen, blood, mucociliary clearance, nose.

Material and methods.

From 2016 to 2019, we carried out a comprehensive examination and treatment of 120 patients with diseases of the nose and paranasal sinuses, who were treated in the otorhinolaryngology department of the Multidisciplinary Hospital at the Tashkent Medical Academy, who underwent combined endonasal surgical interventions, and also conducted clinical studies on the effectiveness of hemostatic funds.

The degree of blood loss was assessed according to V.G. Ermolaeva modified by L.N. Kryukova, developed specifically for assessing the volume of blood loss in ENT surgery. According to these criteria, zero degree of blood loss corresponds to a volume of 14 ± 1.8 ml of blood, degree 1 - 27 ± 0.9 ml, degree 2 - 53 ± 1.5 ml, degree 3 - 100 ± 2.79 ml, degree 4 - 120 -240 ml of blood. In patients with nosebleeds, the assessment of the degree of blood loss was carried out on the basis of clinical and laboratory data. The degree of trophic changes in the nasal mucosa in patients after various methods of stopping bleeding was carried out by visual examination on the 3rd and 7th days after surgery.

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Introduction.

Recently, the frequency of nosebleeds, which is the most common indication for hospitalization in ENT hospitals, has increased dramatically [1]. Patients with this pathology account for up to 20.5% of all hospitalized patients [2].

According to studies, 80% of nosebleeds are caused by systemic factors, among which arterial hypertension plays a priority role. Also, frequent causes of nosebleeds are injuries of the maxillofacial region, tumors of the nose and paranasal sinuses, systemic diseases of the connective tissue and coagulopathy of various origins [3]. In practice, more often (80-90%) there are bleeding from the antero-lower parts of the nasal septum (Kiesselbach zone), where the great palatine and anterior ethmoid arteries anastomose [4]. Nosebleeds from the posterior and posterior-upper parts of the nasal cavity (Woodruff zone) are less common, but they are characterized by a persistent, recurrent course, and are often life-threatening [5]. Difficulties in stopping bleeding from these departments are associated with the presence of a developed system of anastomoses between the basins of the external and internal carotid arteries.

There are few experimental studies on the use of cyanoacrylate compositions in patients with nosebleeds, during the application of which hemostasis was achieved within 150 seconds [6].

Some have reported that QuickClot is highly effective in controlling nosebleeds.

According to some authors, the use of a hemostatic collagen sponge for stopping nosebleeds is effective, but limited due to the low fixing ability to the source of bleeding. At the same time, the authors noted the high efficacy of the drug tachocomb, which allows to achieve a persistent hemostatic effect within 1 minute with recurrent nosebleeds from the Kisselbach zone in 20 patients [7].

Some authors report on the successful use of the gelfoam for low intensity anterior nosebleeds. According to some authors, the surzhitsel remedy was effective in 8 patients with bleeding from the posterior nasal cavity, and according to some authors, the remedy showed high efficacy for nosebleeds associated with coagulopathy in children [8].

According to the studies of some foreign authors, when applying fibrin glue, it was possible to stop nosebleeds in 2 minutes and 30 seconds, while the remedy was effective both in front and rear nosebleeds. In comparison with the methods of chemical and electrocoagulation, as well as with tamponade of the nasal cavity, such advantages as more reliable hemostasis, the absence of recurrent bleeding, pain, inflammatory and atrophic changes in the nasal mucosa (including in the long term after manipulation) were noted. Also, the use of fibrin glues is effective for nosebleeds against the background of hereditary telangiectasia and coagulopathies

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[9]. The use of floseal fibrin glue for persistent nosebleeds allowed to reduce the number of bleeding recurrences compared with gauze tamponade from 40% to 14%, saving patients from the need for occlusion of the great vessels, and also proved to be effective in surgical interventions in the nasal cavity [10].

Thus, despite all the variety of methods for stopping nasal bleeding (cryotherapy, chemical cauterization, exposure to drugs, the use of pneumotampons, etc.), most of them are used less often than gauze tamponade due to their lower efficiency and the presence of complications. Obviously, non-lump methods for stopping nosebleeds seem to be more physiological [11]. Many modern techniques (endoscopic mono- and bipolar coagulation, X-ray endovascular occlusion of the great vessels) are also not devoid of their drawbacks, therefore, the search for methods of reliable and safe hemostasis for nosebleeds continues to be an urgent problem of otorhinolaryngology [12].

Results and discussion.

The study excluded patients with diseases of the connective tissue, liver, blood system, various systemic disorders of hemostasis, as well as patients who took antiplatelet agents or anticoagulants for a long time due to concomitant diseases. All patients underwent routine surgery for diseases of the nose and paranasal sinuses. In all patients with these diseases in the preoperative period, an assessment of the coagulogram parameters, blood coagulation time, bleeding time, and no deviations from the reference parameters were found in laboratory analyzes of the studied groups. Laboratory biochemical studies were performed on Express-plus devices from Bayer (USA), Delta from Cope instruments (Finland), Specific Basic from Cope instruments (Finland). All patients underwent simulative surgical interventions under local and general anesthesia.

Anterior tamponade of the nasal cavity was performed in 50 of 120 patients in order to stop nosebleeds, in 70 local hemostatic agents were applied.

Evaluation of the effectiveness of treatment in the studied groups of patients was carried out according to the time of stopping bleeding, analysis of the number of relapses of bleeding, according to clinical and laboratory data indicating ongoing blood loss, the need for additional therapeutic and diagnostic measures. The possible influence of the investigated drugs on the main parameters of the blood coagulation system was also investigated.

The group of patients was divided into 2 subgroups depending on the methods of hemostasis used. Anterior tamponade of the nasal cavity using a gauze turunda was performed in 50 patients - these patients constituted the control group. In 70 patients, tamponade of the nasal cavity was performed with a hemostatic sponge, modeled in the form of a film. In this case, the hemostatic drug was removed from the nasal cavity on the 3rd day after the manipulation. In all groups of patients with nosebleeds, hemostatic therapy with ethamsylate was also carried out at a dosage of 12.5% - 4.0 i / m 2 times

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during the day. Patients with blood loss exceeding 10% of the circulating blood volume received infusion replacement therapy. Data on patients and hemostatic agents used are presented in Table 1.

Table 1. Distribution of patients with nosebleeds by gender and age.

Used hemostatic agents	Men			Women			Total
	< 41	41-60	> 60	< 41	41-60	> 60	
Gauze swab	7	1	9	5	1	6	50
Hem.sponge	1	2	6	7	1	8	70
Total	1	3	1	1	2	1	120

In the studied groups of patients, the time to stop bleeding was determined, characterized by the absence of blood flow along the posterior wall of the pharynx during pharyngoscopy. We also analyzed the number of relapses of bleeding after removal of the tampon or hemostatic. The effect of local hemostatic agents on the parameters of hemostasis in the general blood flow was studied. The nature of changes in the nasal mucosa after manipulations, as well as complications associated with manipulation, was determined; the degree of pain was assessed by points of a visual analogue scale.

Comparative analysis of the studied hemostatic agents and gauze tamponade showed that the average time to complete stopping bleeding, characterized by the absence of blood flow along the posterior pharyngeal wall during pharyngoscopy, after a typical gauze tamponade was 9.8 ± 1.7 minutes. With tamponade of the nasal cavity with a hemostatic sponge, hemostasis was achieved on average in 4.4 ± 0.6 minutes (table 2).

Table 2.

The effect of domestic local hemostatic agents on stopping bleeding in patients with nosebleeds (min).

The studied indicators	Control group	Group with application Hem.sponge **(n - 22)**
Time to stop bleeding,	9,8±1,7	4,4±0,6 *

*- The differences are statistically significant (p < 0,05)

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Thus, the final hemostasis in the group of patients using hemostatic agents was achieved significantly faster than in the control group.

We also studied the parameters of the blood coagulation system of the studied groups of patients 30 minutes after the application of local hemostatic agents in order to identify their possible influence on the parameters of systemic hemostasis (Table 3). For comparison with baseline data, these patients underwent coagulogram prior to application of local hemostatic agents.

Table 3

The influence of hemostatic agents on some indicators of hemostasis in patients with nosebleeds

The studied indicators	Before manipulation	After operation		
		Control group	Group with application hem.sponge	Group with application gauze swab
APTV	30,4±3,	32,9±3,	31,7±2,	29,8±3,4
Prothrombin index,%	95,6±9,9	98,2±10,1*	92,7±8,9*	93,6±9,2*
Plasma fibrinogen, g / l	2,4±0,5	3,1±0,4*	2,8±0,3*	3,2±0,3*

*- the difference is not reliable (p>0,05)

So the APTT after surgery in the control group was 32.9 ± 3.7 seconds, after exposure to the hemoguba - 31.7 ± 2.9 seconds (the differences are not statistically significant - p> 0.05). The prothrombin index after surgery in the control group was 98.2 ± 10.1%, after application of hemostatic sponges - 92.7 ± 8.9% (p> 0.05). The level of fibrinogen in the control group was 3.1 ± 0.4 g / l, with the application of hemostatic sponges - 2.8 ± 0.3 g / l (p> 0.05). Thus, no clinically significant effect of local hemostatic agents on the main parameters of hemostasis in the general blood flow was revealed.

The laboratory parameters of the observed groups of patients revealed anemia, erythropenia, increased ESR and other signs of acute blood loss. The study in dynamics after stopping the bleeding of the main clinical and laboratory parameters characteristic of acute blood loss allows one to judge the effectiveness of primary

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hemostasis in the studied groups of patients. The results of clinical and laboratory studies on the 1st, 3rd, and 7th days are shown in tables 4-5.

Table 4.

Dynamics of clinical and laboratory parameters in the control group.

Indicators	**Research results (from the start of treatment)**		
	1-st day	**3-rd day**	**7-th day**
Hemoglobin level, g / l	101±10,2	105± 10,1	108± 10,7
Erythrocytes	2,7±0,3	3,4± 0,2	3,6± 0,4
Iron serum, μmol / l	4,8±0,5	7,5±0,6	10,2±1,2
Hematocrit %	26,6± 3,1	31,8±2,9	33,1±3,8
ESR mm / h	33,7± 4,5	26,9± 2,6	22,8±3,5
Systolic arterial pressure, mm Hg Art.	90,7±9,2	П4,2±10,7	128,3^11,4
Heart rate,	98,4±10,2	94,3±9,7	88,7±9,1

*- the difference is not reliable (p>0,05)

Table 5.

Dynamics of the main clinical and laboratory parameters in the group with the use of hemostatic sponges.

Indicators	**Result of research (from the start of treatment)**		
	1 -st day	3-rd day	7-th day
Erythrocytes млн./мкл	103,3± 12,2	132,5± 12,4	149,1±15,7*
Iron	2,8±0,3	3,5± 0,4	4,7± 0,4

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Hematocrit %	4,6±0,3	8,8±0,6	14,2±1,2
ESR mm / h	27,6±2,1	43,8±	45,1±3,8*
Systolic	35,7± 3,5	19,9±2,6	13,8±1,5*
Heart rate, beats / min	100,6±10,5	115,8±11,2	130,4±11,9
Erythrocytes	99,7±10,6	92,1 ±9,9	86,9±9,3

*- the difference is not reliable (p>0,05)

The tables show that an earlier recovery of the physiological values of red blood, as well as the normalization of hemodynamic parameters, occurs in the group of patients with the use of local hemostatic agents, which indicates the absence of ongoing bleeding in the early stages after manipulation.

In a visual assessment of the state of the nasal mucosa a week after stopping the bleeding, in a number of cases, the development of edema of the nasal mucosa, as well as, to varying degrees, trophic disorders was noted. To assess the degree of impairment of mucociliary clearance of the mucous membrane of the nasal cavity 7 days after the cessation of nosebleeds in the studied groups of patients, a saccharin test was used. The results of these studies are shown in table 6.

Table 6.

The nature of changes in the nasal mucosa associated with the cessation of nosebleeds in the studied groups of patients 7 days after manipulation

The studied indicators (average values)		Control group (п=50)	Group with application Hem.sp. (п=70)
Edema	Expressed	13	2
	Absent	0	15
	Moderate	8	5
Fibrinous	Expressed	12	1
	Absent	1	18
	Moderate	8	3

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Trophic	Expressed	4	0
	Absent	5	20
	Moderate	12	2
Indicators of saccharin dough (norm 6-8 min)		29,4±3,1 мин	8,6±0,9 мин
Pain syndrome with manipulation of points VAS		8,19±0,73	3,22±0,27

The table shows that in the groups of patients with the use of local hemostatic agents by the 7th day there were no pronounced trophic disorders and edema of the nasal mucosa, while in the control group, where a gauze swab was used, in most cases the development of fibrinous plaque and persistent edema was noted mucous membrane.

The results of the saccharin test did not reveal significant violations of the mucociliary clearance of the nasal mucosa in the groups of patients using the hemostatic sponge compared to the group of patients where the gauze tamponade was used. There was also a significantly lower severity of pain in terms of the parameters of the visual analogue scale of pain in the groups of patients using local hemostatic agents.

Thus, in the groups of patients with the use of local hemostatic agents, in comparison with the control group, an earlier onset of complete hemostasis was noted, as well as the absence of recurrent bleeding after manipulation. In the group of patients using a gauze tampon, a greater number of undesirable side effects of tamponade in the form of edema and trauma to the nasal mucosa were noted, and these patients also had more pronounced pain syndrome. There were no complications associated with the application of hemostatic agents into the nasal cavity in the studied groups of patients.

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Conclusion.

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Summarizing the data obtained, we can conclude that the use of new domestic hemostatic agents of local action in patients with nosebleeds can increase the effectiveness of treatment by achieving faster and more stable hemostasis in comparison with gauze tamponade, as well as reduce the number of complications and the duration of hospitalization.

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